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Fall 9-1-2018

# AHRC 235.01: Cariopulmonary Anatomy & Physiology

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**The University of Montana – Missoula College  
Respiratory Care Program**

**COURSE NUMBER AND TITLE:** AHRC 235 Cardiopulmonary Anatomy & Physiology

**DATE REVISED:** Summer 2018

**SEMESTER CREDITS:** 3

**CONTACT HOURS:** 3 hours per week / 45 hours per semester

**PREREQUISITE:** Acceptance into the Respiratory Care program.

**CLASS MEETS:** Tuesday & Thursday 1100 hrs – 1230 hrs, Room 112

**FACULTY:** Paul J. Crockford, MEd, RRT

[paul.crockford@umontana.edu](mailto:paul.crockford@umontana.edu)

243-7918 (office)

Office: 316

Office Hours: M & T 1200hrs – 1400 hrs, W 1200 hrs – 1300 hrs and by Appointment

**RELATIONSHIP TO PROGRAM:**

This course offers the students the opportunity to develop more detailed knowledge of cardiopulmonary anatomy and physiology. They will be able to apply this knowledge to their critical care experiences and disease pathophysiology.

**COURSE DESCRIPTION:**

An in-depth study of the macro-and micro-anatomy of the cardiopulmonary system with a focus on structure, and function. Other topics which include calculations of physiological parameters as applicable to clinical practice are: the mechanics and regulation of ventilation, gas exchange and transport, and the ventilatory aspects of acid-base problems. Finally, the dynamics of the cardiac and pulmonary systems are brought into focus as a single and integrated unit in relation to hemodynamics, and physiology of ventilatory support.

**STUDENT PERFORMANCE OUTCOMES:**

1. Describe the general principles of the respiratory system and list terms and symbols relevant to respiratory physiology.
2. Discuss the structures and functions as they pertain to the macro-and micro-anatomy of the cardiopulmonary system, including principles of lung development.
3. Describe the mechanics and regulation of ventilation and be able to calculate values for minute alveolar ventilation, compliance, and airway and vascular resistance.
4. Discuss how gases are exchanged and transported in the body and calculate alveolar-arterial oxygen differences and oxygen contents, and various hemo-dynamic parameters.
5. Describe the histology of the tracheobronchial tree, and circulatory system.
6. Explain the ventilatory aspects of acid-base problems
7. Describe in detail the alveolar gas exchange unit (acinus).
8. Define and explain the significance of the ventilation-perfusion ratio.
9. Conceptualize the tracheobronchial tree including all segments.
10. Describe the function of the respiratory neurons of the medulla oblongata.
11. Discuss fetal lung development.
12. Describe how blood flows through the heart and lung and the influence of gravity on the blood flow.
13. Describe the pulmonary, bronchial and coronary circulations.
14. Define and calculate various hemodynamic measurements and determinants of cardiac output.

**METHODS OF INSTRUCTION:** Lecture, reference reading, assignments, and group discussion.

**STUDENT ASSESSMENT METHODS AND GRADING PROCEDURES:**

*Specific dates for exams will depend upon our progress through the course material and will be announced well in advance. All exams will be administered via Moodle. Regular attendance will be essential to success in the course as open class discussion will be a major learning component*

**Unit Exams (9 ea): 90%****GRADING SCALE:**

|                                       |      |      |         |      |      |        |
|---------------------------------------|------|------|---------|------|------|--------|
|                                       | A =  | 4.0  | 95-100% | C =  | 2.00 | 74-76% |
| <b>Assignments/Participation: 10%</b> | A- = | 3.67 | 90-95%  | C- = | 1.67 | 70-73% |
| <b><u>(Approximate Breakdown)</u></b> | B+ = | 3.33 | 87-89%  | D+ = | 1.33 | 67-69% |
|                                       | B =  | 3.00 | 84-86%  | D =  | 1.00 | 64-66% |
|                                       | B- = | 2.67 | 80-83%  | D- = | .067 | 60-63% |
|                                       | C+ = | 2.33 | 77-79%  | F =  | 0.00 |        |

Students in the Respiratory Care Program **must have a “B-” (80% or greater) final grade in order to progress** within the program. Test questions will be based on unit objectives. Unit objectives are to be used as study guides.

**METHODS TO IMPROVE COURSE:**

Student evaluations and respiratory faculty assessment of course content.

**ATTENDANCE:** Class attendance is an integral part of this course. Exam dates will be announced. Only legitimate reasons for missing an announced exam will be accepted. Failure to appear for scheduled exams will result in zero points awarded. Expect periodic unannounced quizzes. There is no make-up for missed quizzes. SEE: TEST/QUIZ MAKEUP

**Please refer to your Student Manual for additional Policies and Student Resources.**

**ACADEMIC INTEGRITY:**

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by The University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at [http://life.umt.edu/vpsa/student\\_conduct.php](http://life.umt.edu/vpsa/student_conduct.php).

**DISABILITY ACCOMODATION:**

Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely way. Please speak with me after class or in my office. Please be prepared to provide a letter from your DSS Coordinator. For more information, visit the Disabilities Services website at <http://www.umt.edu/dss/> or call 406-243-2243 (voice/text)

**Note: Instructor reserves the right to modify syllabi and assignments as needed based on faculty, student, and/or environmental circumstances.**

**Cell Phones/Pagers:** Due to an increasing number of students, who own and use cell phones and pagers, it has become necessary to institute a policy during class times. As you are aware, these tools are distracting to an entire class. However, some students require them for business, which allows them to further their education. Please follow these guidelines:

If the cell phone/pager is not business or emergency related, please turn it off.

Use the vibrating option on your pager.

Do not listen to the messages in class. Please leave class quietly.

**CELL PHONES AND PAGERS MUST BE TURNED OFF DURING EXAM AND CLASS PRESENTATIONS.**

**SEATING:** Many classrooms have chairs to accommodate persons with disabilities. These chairs will display the international disability symbol and are assigned to a particular student. Please refrain from using these chairs or making adjustments to them unless the chair is assigned to you. If you think you may have the need for a specific chair, please contact Disability Student Services. Thank you for your cooperation.

**TEST/QUIZ MAKEUP:** Make-up exams and lab experiences **will only be given under extreme circumstances** and then only if: **a)** permission is granted *in advance* by the course instructor, or **b)** a written excuse is provided by a medical doctor. **The burden of proof is on the student**, so you must document and prove a justifiable absence. Not following this procedure prior to the exam will automatically result in a zero points awarded for the exam. Missed tests need to be made up within **one week** of the original date given. You are responsible for contacting the

Academic Support Center, 243-7826, to schedule the make-up. Failure to do so will result in a ***ZERO*** grade for the missed test.

The faculty senate guidelines concerning the issuance of incomplete grades will be followed. Attention to critical dates such as P/NP, drop, etc. is the responsibility of the student. Students wishing to drop the class after the drop deadline will need a documented justifiable reason for doing so. Dropping the class for fear of bad grade or to protect a GPA are **not** justifiable reasons. The principles embodied in the **Student Handbook Code** will be adhered to in this course.

Quizzes: Failure to be present for quizzes will result in a zero being recorded and used in computing your average. There will be no make-up opportunities for missed quizzes.

Homework: **It is the expectation that homework will be turned in when due.** If you are not present, it is your responsibility to see that it is in my office by 4:00 p.m. on the due date **or a zero will be recorded and used in computing your average.**

**Student Decorum:** All students are expected to conduct themselves in a professional manner at all times in both the classroom and alternative settings. Discussions of an academic nature are encouraged and can enhance student learning. However, social conversation is not appropriate during lectures as it creates a distraction to students and faculty. Respect and courtesy will be shown at all times to peers, faculty, and the general public. **There are no exceptions to this policy at any time or under any circumstances.**

#### **REQUIRED TEXTS:**

|                   |   |
|-------------------|---|
| <b>Title:</b>     | <b>1) Cardiopulmonary Anatomy and Physiology, Sixth Edition</b> |
| <b>Author:</b>    | <b>Des Jardins, T</b>   |
| <b>Publisher:</b> | <b>Thomas/Delmar</b>  |

## **Unit Outlines and Readings:**

### **COURSE OUTLINE: THE CARDIOPULMONARY SYSTEM (Tentative schedule)**

- I. Anatomy and Physiology of the Respiratory System (1)
- II. Ventilation (2)
- III. Pulmonary Function Measurements (minimal) (3)
- IV. Diffusion of Pulmonary Gases (4)
- V. Anatomy and Physiology of the Circulatory System (5)
- VI. Hemodynamic Transport (15)
- VII. Oxygen & CO<sub>2</sub> Transport (6)
- VIII. Ventilation Perfusion (8)
- IX. Control of Ventilation (9)